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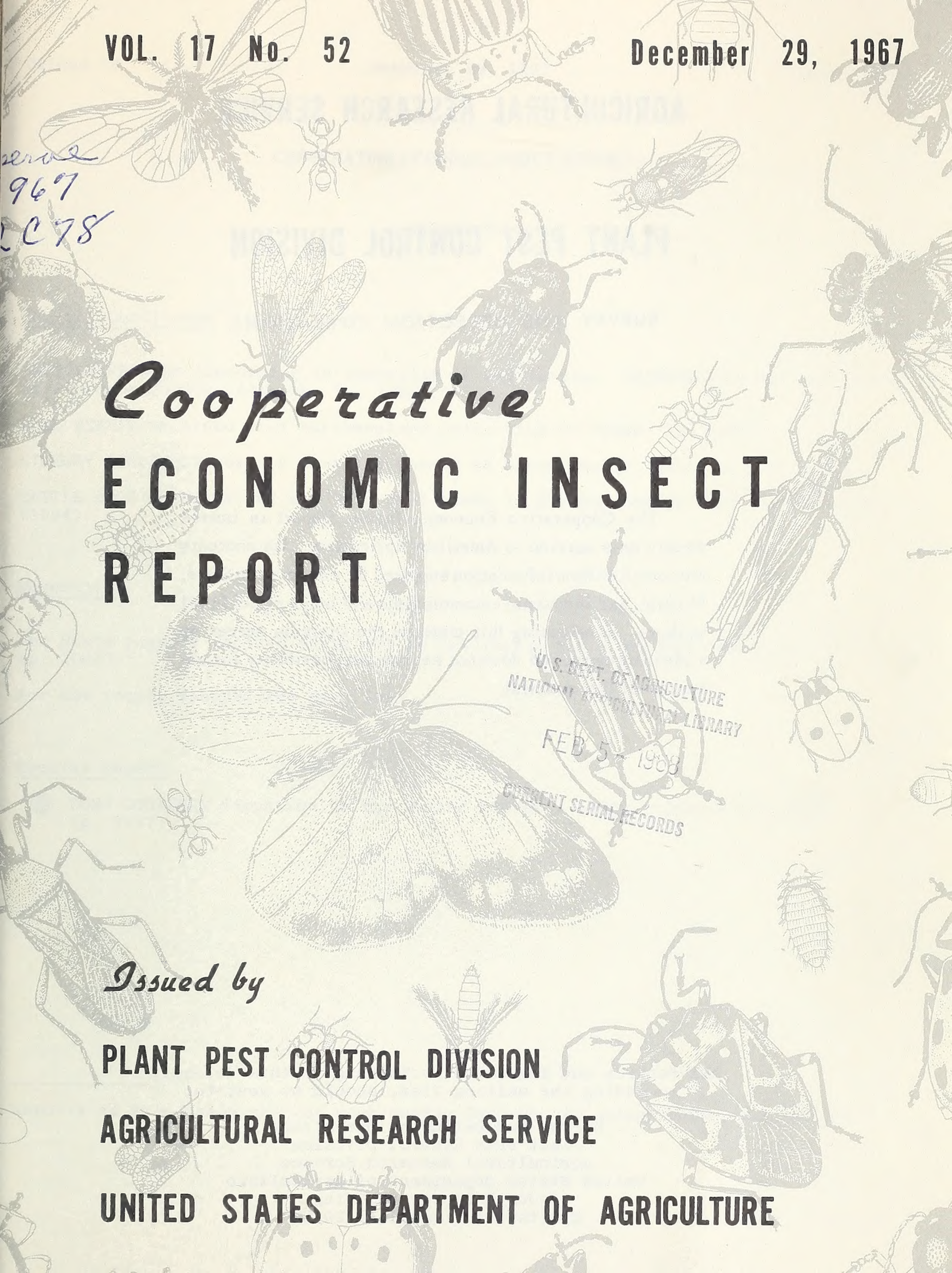

Cooperative
ECONOMIC INSECT REPORT

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PLANT PEST CONTROL DIVISION
AGRICULTURAL RESEARCH SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE

AGRICULTURAL RESEARCH SERVICE

PLANT PEST CONTROL DIVISION

SURVEY AND DETECTION OPERATIONS

The Cooperative Economic Insect Report is issued weekly as a service to American Agriculture. Its contents are compiled from information supplied by cooperating State, Federal, and industrial entomologists and other agricultural workers. In releasing this material the Division serves as a clearing house and does not assume responsibility for accuracy of the material.

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Volume 17 December 29, 1967 Number 52

COOPERATIVE ECONOMIC INSECT REPORT

HIGHLIGHTS

Current Conditions

BEET LEAFHOPPER increasing in foothills of California. GREENBUG damaging ryegrass in Cleburne County, Alabama. (p. 1081).

BOLL WEEVIL recorded most northwestern collection in Texas. (p. 1082).

HICKORY SHUCKWORM heavily damaging pecans in Mayes County, Oklahoma. (p. 1082).

CATTLE LICE numerous and annoying beef herds in Alabama and in Kane County, Utah. (1084).

Detection

New State records include CRAZY ANT in California and a EULOPHID WASP in Missouri. (p. 1084).

For new county records see page 1085.

Special Report

● CORN ROOTWORM Situation in the United States - 1967 - Outlook for 1968. (p. 1087).

Reports in this issue are for week ending December 29 unless otherwise indicated.

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WEATHER OF THE WEEK ENDING DECEMBER 25, 1967

HIGHLIGHTS: Bitter cold continued over the West until the weekend brought rapid warming. In contrast the East, unseasonably mild during most of the week, turned sharply colder Friday. Heavy snow continued in the Southwest and tornadoes struck the Deep South.

PRECIPITATION: Heavy snow continued early in the week in the southern Rockies. By Wednesday 83 inches covered the Flagstaff, Arizona, area. Snow approached record depth in some sections of southeastern Utah and nearby areas in Colorado and New Mexico. Three to six inches which fell in the lower elevations in Washington melted rapidly on Friday causing local flooding. Violent thunderstorms and numerous tornadoes in the warm, moist gulf air preceeded rapidly falling temperatures and snow as a strong cold front advanced east of the Mississippi River. Precipitation amounts exceeded two inches in parts of Illinois, Indiana, over the southern Appalachians, and in south-central Louisiana. Tornadoes occurred in Missouri, Illinois, Indiana, northeastern Texas, Arkansas, Mississippi, and Alabama. Some of the tornadoes caused extensive damage and a few deaths.

Weather of the week continued on page 1085.

SPECIAL INSECTS OF REGIONAL SIGNIFICANCE

BEET LEAFHOPPER (Circulifer tenellus) - CALIFORNIA - Increasing in most foothill areas. Ranged 2-7 per 100 sweeps on flats in Los Banos Hills, Merced County; heavier on slopes. Averaged 30 per 100 sweeps in Oil King School area near Coalinga and 20 per 100 sweeps on 1,400 acres in Pyramid Hills in Kern County. Heaviest in western Kern County; ranged 2-5 per 10 sweeps in Elk Hills, Derby Acres, Thirty-six Hills, Twenty-five Hills, and Maricopa areas with 11-22 per 10 sweeps in some spots. (Cal. Coop. Rpt.).

GREENBUG (Schizaphis graminum) - ALABAMA - Light to heavy December 15 on 3 annual ryegrass lawns at Heflin, Cleburne County; much yellowing with older leaves dying. (Ventress et al.). OKLAHOMA - Ranged 5-50 per linear foot in Tillman and Cotton County wheat; less than 15 per linear foot in Payne and Noble Counties; light in Mayes County wheat. (Okla. Coop. Sur.).

SPOTTED ALFALFA APHID (Therioaphis maculata) - MISSISSIPPI - Light, 20 per 100 sweeps, in Pontotoc County alfalfa. (Dinkins).

CORN, SORGHUM, SUGARCANE

SOUTHWESTERN CORN BORER (Zeadiatraea grandiosella) - OKLAHOMA - Stalk infestations ranged 20-40 percent in Hughes and Pittsburg County corn. (Okla. Coop. Sur.).

CORN PLANTHOPPER (Peregrinus maidis) - FLORIDA - Abundant on corn at Homestead, Dade County, December 8 (Bess); one of 43 adults in sample parasitized. (Mead).

SMALL GRAINS

AN APHID (Rhopalosiphum padi) - OKLAHOMA - Averaged 8 per linear foot in 5-inch wheat in Tillman County. (Okla. Coop. Sur.).

WINTER GRAIN MITE (Penthaleus major) - OKLAHOMA - Ranged 55-100 per linear foot in 3 of 6 wheat fields checked in Tillman and Cotton Counties. (Okla. Coop. Sur.).

TURF, PASTURES, RANGELAND

AN APHID (Rhopalosiphum padi) - FLORIDA - Probably this species heavy on ryegrass in 5-acre sample at ranch near Belle Glade; 27 dead spots counted. Nearly 100 percent control by a braconid, Lysiphlebus testaceipes. (Genung, Dec. 13).

A GRASSWORM (Mocis sp.) - FLORIDA - Damage heavy to 320 acres of ryegrass pasture as controls applied at ranch near Belle Glade, Palm Beach County; 120 additional acres killed. (Genung, Dec. 13).

FORAGE LEGUMES

PEA APHID (Acyrthosiphon pisum) - MISSISSIPPI - Moderate, 80-100 per 100 sweeps, on vetch and alfalfa in Pontotoc County. (Dinkins). ARIZONA - Ranged 0-60 per 100 sweeps in Yuma County alfalfa and very few in Maricopa County alfalfa since heavy rains. (Ariz. Coop. Sur.).

THREE-CORNERED ALFALFA HOPPER (Spissistilus festinus) - ARIZONA - Averaged 150 per 100 sweeps in Yuma County and 20 per 100 sweeps in Maricopa County. (Ariz. Coop. Sur.). MISSISSIPPI - Adults light, 8-10 per 100 sweeps, in Pontotoc County alfalfa. (Dinkins).

BEET ARMYWORM (*Spodoptera exigua*) - ARIZONA - Averaged 20 per 100 sweeps in alfalfa in Wellton and Mohawk area of Yuma County. (Ariz. Coop. Sur.).

ALFALFA CATERPILLAR (*Colias eurytheme*) - ARIZONA - Averaged 20 per 100 sweeps in alfalfa at Yuma, Yuma County. (Ariz. Coop. Sur.).

LYGUS BUGS (*Lygus* spp.) - ARIZONA - Averaged 160 per 100 sweeps in alfalfa at Yuma, Yuma County; 50 per 100 sweeps in Maricopa County. (Ariz. Coop. Sur.).

COTTON

BOLL WEEVIL (*Anthonomus grandis*) - TEXAS - Specimen collected between Pampa and McLean in Gray County by J. F. Whaley; area approximately 15-20 miles from Donley County where infestation known to occur. Det. by H. R. Burke. This is a new county record and most northwestern collection in State. (Almand, Dec. 1).

DECIDUOUS FRUITS AND NUTS

WESTERN PEACH TREE BORER (*Sanninoidea exitiosa graefi*) - CALIFORNIA - Larvae moderate in dooryard peach trees in Napa, Napa County, for new county record. (Cal. Coop. Rpt.).

HICKORY SHUCKWORM (*Laspeyresia caryana*) - OKLAHOMA - Damage heavy on Mayes County pecans. (Okla. Coop. Sur.).

PECAN WEEVIL (*Curculio caryae*) - ALABAMA - Larval emergence very heavy in 80+ percent of nuts under large pecan tree at McCullough, Lee County; exit holes evident. (Barwood, Dec. 15).

CITRUS

BROWN SOFT SCALE (*Coccus hesperidum*) - ARIZONA - Limited infestations in commercial citrus in Yuma County; troublesome in citrus greenhouses. (Ariz. Coop. Sur.).

COWPEA APHID (*Aphis craccivora*) - ARIZONA - Still found on young terminal growth at Yuma, Yuma County. (Ariz. Coop. Sur.).

OTHER TROP. & SUBTROP. FRUITS

AN ARMORED SCALE (*Hemiberlesia lataniae*) - CALIFORNIA - Moderate to heavy on guava nursery stock in Vista and heavy on sago-palm nursery stock, *Cycas revoluta*, in Coronado, San Diego County. (Cal. Coop. Rpt.).

ORNAMENTALS

ROSE APHID (*Macrosiphum rosae*) - ALABAMA - Increasing greatly, 25-100 per stem, on multiflora rose in Lee County due to warm weather; buds and blossoms deformed. (McQueen, Dec. 15).

SPIREA APHID (*Aphis spiraecola*) - ALABAMA - Buildup great, 50-100 per limb, on Thunberg and Vanhoutte spirea in central area and especially in Lee County; eggs heavy on stems with much hatching after several warm days. (McQueen, Dec. 15).

AN ERIOCOCCID SCALE (*Eriococcus coccineus*) - CALIFORNIA - Heavy on cactus nursery stock in Santa Cruz, Santa Cruz County. (Cal. Coop. Rpt.).

AN ARMORED SCALE (Genaparlatoria pseudaspidiotus) - FLORIDA - Adult damage to leaves severe on all 10 orchid plants inspected at nursery in Opa Locka, Dade County (Cervone); collected on orchid in Miami, Dade County, December 7 (Cervone, Prange). This is a new Florida Department of Plant Industry county record. (Fla. Coop. Sur.).

ARMORED SCALES - ALABAMA - Fiorinia theae increasing as all stages present on camellia and Burford holly; male emergence heavy. Adult emergence ranged 5-25 per leaf per day on most plants and 50-200 per leaf on heavily infested plants. (McQueen, Dec. 15). NEW MEXICO - Unaspis euonymi heavy on all euonymus plants in nursery at Albuquerque, Bernalillo County. (Heninger).

TWO-SPOTTED SPIDER MITE (Tetranychus urticae) - ALABAMA - Light to heavy with some damage to numerous azalea plantings in Lee County; egg laying heavy. (McQueen, Dec. 15).

FOREST AND SHADE TREES

BARK BEETLES - CALIFORNIA - Pityophthorus ponderosae found on 400 ponderosa and Jeffrey pine trees in 150-acre stand in Milford Burn Plantation in Plumas National Forest; 5-10 percent of plantation infested. (Savercool, USFS). Ips pini damaging tree tops of 40 coulter and ponderosa pines in 100-acre stand in Alvin Meadows in San Bernardino National Forest; moving down trunks. (Cruz, USFS).

APHIDS - ALABAMA - Eulachnus spp. much heavier, 50-200 per branch tip, on many Lee County pines; numerous predators present. (McQueen). NEW MEXICO - Cinara sp. very light to heavy on ornamental ponderosa pine at Albuquerque, Bernalillo County. (Heninger).

ARMORED SCALES - MARYLAND - Phenacaspis pinifoliae medium to heavy on extensive windbreak planting of white pine near Laurel, Prince Georges County. (U. Md., Ent. Dept.). FLORIDA - Damage by all stages of Pinnaspis strachani moderate on stems and leaves on 100 of 200 orchidtrees, Bauhinia blakeana, at nursery in Hypoluxo, Palm Beach County, December 8. (Wyles, Long).

SOFT SCALES - FLORIDA - Coccus acuminatus damaging leaves on ash along Sante Fe River area, Columbia County, November 2. (Graham). This is a new host record. (Fla. Coop. Sur.). IOWA - Toumeyella numismaticum on Winneshiek County pine. (Gunderson).

MAN AND ANIMALS

MOSQUITOES - LOUISIANA - Larvae collected in Jefferson Parish December 8-14: Culex restuans, C. salinarius, and Culiseta inornata. Floodwater species decreasing in light traps; Anopheles atropos very heavy in Grand Isle area. (Stokes).

SCREW-WORM (Cochliomyia hominivorax) - No cases reported in U.S. December 17-23. Total of 110 cases reported in portion of Barrier Zone in Republic of Mexico as follows: Baja California 3, Territorio sur de Baja California 13, Sonora 17, Chihuahua 16, Coahuila 17, Nuevo Leon 7, Tamaulipas 37. Total of 35 cases reported in Mexico south of Barrier Zone. Barrier Zone is area where eradication operations underway to prevent establishment of self-sustaining population in U.S. Sterile screw-worm flies released: Texas 25,768,000, Arizona 560,000, California 200,000, Mexico 106,720,000. (Anim. Health Div.).

COMMON CATTLE GRUB (*Hypoderma lineatum*) - ALABAMA - Larvae heavy beneath skin on backs of many cattle in Montgomery County; 50+ larvae on one older bull. (Thompson, Dec. 15).

NOSE BOT FLIES (*Cephenemyia* spp.) - OKLAHOMA - Pupation begun in Cherokee and Pittsburg Counties. (Okla. Coop. Sur.).

CATTLE LICE - UTAH - Numerous on some Kane County beef herds. (Knowlton). IOWA - *Haematopinus eurysternus* moderate to heavy on feeder calves at Aplington, Butler County; calves shipped from out-of-state. (Iowa Ins. Sur.). ALABAMA - *Bovicola bovis*, *Linognathus vituli*, and *H. eurysternus* annoying beef herds in Bibb, Bullock, and other central and southern counties. (Odom et al., Dec. 15).

HARD-BACKED TICKS - OKLAHOMA - Heavy on deer in Cherokee County; 90 percent *Ixodes scapularis*, 5 percent *Dermacentor albipictus*. (Okla. Coop. Sur.).

BROWN RECLUSE SPIDER (*Loxosceles reclusa*) - OKLAHOMA - Active in some Payne County homes. (Okla. Coop. Sur.).

HOUSEHOLDS AND STRUCTURES

CRAZY ANT (*Paratrechina longicornis*) - CALIFORNIA - Adults medium in parkway lawn strip in San Diego County. Collected by F. Yaruss, December 8, 1967, for new State record. Det. by M. Wasbauer. Initial delimitation survey reveals 5 city blocks infested. (Cal. Coop. Rpt.).

PACIFIC DAMPWOOD TERMITE (*Zootermopsis angusticollis*) - CALIFORNIA - Adults heavy in fir lumber at lumber company in Oroville, Butte County. (Cal. Coop. Rpt.).

HOUSE FLY (*Musca domestica*) - ALABAMA - Adult emergence increased in central and southern areas during last 10-20 days of unusually hot and humid weather; entering home and commercial buildings. (McQueen).

STORED PRODUCTS

INDIAN-MEAL MOTH (*Plodia interpunctella*) - IOWA - In stored shelled corn in central and west-central areas. (Iowa Ins. Sur.).

BENEFICIAL INSECTS

A EULOPHID WASP (*Tetrastichus sokolowskii*) - MISSOURI - Collected from *Plutella xylostella* by K. D. Biever at Columbia, Boone County, October 5, 1967. Det. by F. D. Parker. This is a new State record. (Munson).

LADY BEETLES - ALABAMA - Feeding on a pine aphid, *Eulachnus* sp., on many 6 to 8-foot pines in isolated areas of Lee County. Adult counts per tree: *Hippodamia convergens* 25-30, *Olla abdominalis* 10-15, and some *Coccinella novemnotata*. (McQueen).

A DAMSEL BUG (*Nabis ferus*) - ARIZONA - Averaged 100 per 100 sweeps in alfalfa in Litchfield Park area, Maricopa County. (Ariz. Coop. Sur.).

BIG-EYED BUGS (*Geocoris* spp.) - ARIZONA - Averaged 30 per 100 sweeps of Maricopa County alfalfa. (Ariz. Coop. Sur.).

FEDERAL & STATE PLANT PROTECTION PROGRAMS

GRASSHOPPERS - NEW MEXICO - Damaging iris and other flower foliage around homes in Albuquerque area, Bernalillo County. (Heninger).

CARIBBEAN FRUIT FLY (*Anastrepha suspensa*) - FLORIDA - Larvae taken on calamondin and guava at residences in St. Petersburg, Hillsborough County, December 14 (Carroll), and on calamondin at grove in Daytona Beach, Volusia County, December 15 (Pott).

MEXICAN FRUIT FLY (*Anastrepha ludens*) - CALIFORNIA - Five sterile flies taken from project traps; last sterile release made October 26; total flies trapped since July 1 is 1,214. No native flies collected in 1967. (Cal. Coop. Rpt.).

SOYBEAN CYST NEMATODE (*Heterodera glycines*) - MISSOURI - Recovered 2 cysts from Lincoln County farm. Det. by V. Owens. This is a new county record. (Maddox).

INSECT DETECTION

New State Records

CRAZY ANT (*Paratrechina longicornis*) - CALIFORNIA - Adults collected in San Diego County by F. Yaruss December 8, 1967. Det. by M. Wasbauer. (p. 1084).

A EULOPHID WASP (*Tetrastichus sokolowskii*) - MISSOURI - Collected from *Plutella xylostella* by K. D. Biever at Columbia, Boone County, October 5, 1967. Det. by F. D. Parker. (p. 1084).

New County Records

BOLL WEEVIL (*Anthonomus grandis*) - TEXAS - Gray County. (p. 1082).

WESTERN PEACH TREE BORER (*Sanninoidea exitiosa graefi*) - CALIFORNIA - Napa County. (p. 1082).

AN ARMORED SCALE (*Genaparlatoria pseudaspidiotus*) - FLORIDA - Dade County. (p. 1083).

SOYBEAN CYST NEMATODE (*Heterodera glycines*) - MISSOURI - Lincoln County. (p. 1085).

Weather of the week continued from page 1080.

TEMPERATURE: The cold of the West intensified and by midweek some areas suffered the coldest temperatures of the season. Cut Bank, Montana, registered 29 degrees below zero Thursday and parts of Montana and North Dakota remained below zero all day long. Winslow, Arizona, registered subzero temperatures on four consecutive mornings. Temperatures averaged below normal from the Pacific Ocean to the western Great Plains. Wide areas from Montana and the Dakotas and southward to Arizona and New Mexico averaged 10 to 18 degrees below normal. Rapid warming began Friday over the West. Cut Bank's temperature climbed from minus 20 degrees to 41 degrees on that day and remained above freezing on Saturday. The opposite pattern prevailed over the East. Unseasonably mild weather continued until Thursday when Pittsburgh, Pennsylvania, registered 67 degrees. Temperatures turned sharply colder Friday as arctic air flowed into the East. The weekend brought subfreezing temperatures to the gulf coast. Tallahassee, Florida, registered 27 degrees Sunday morning. In spite of the cold weekend, the East averaged warmer than normal. A few areas from the southern Appalachians to New England averaged 10 to 12 degrees above normal. (Summary supplied by Environmental Data Service, ESSA).

HAWAII INSECT REPORT

Turf, Pasture - All stages of a GRASS WEBWORM (Herpetogramma licarsisalis) remain light to heavy in widely separate areas of Oahu. Larval damage light to moderate on some lawns at Pearl City, Nuuanu, Wahiawa, and Halawa; light to heavy in golf course, parks, and many lawns at Kaneohe; light to moderate in scattered spots of Pangola grass pasture at Kipapa; light in spots of Kikuyu grass and Pangola grass pasture at Waialee. (Greenwell et al.).

General Vegetables - GREEN PEACH APHID (Myzus persicae) 1-3 per bell pepper plant compared with 25 per leaf in June at Kihei and Kahului, Maui. (Miyahira). CARMINE SPIDER MITE (Tetranychus telarius) generally light on snap beans and eggplants on Oahu although controls curtailed due to inclement weather; heavy, 150-200 per leaf, on eggplant at Kahului, Maui. (Yamamoto, Miyahira). DIAMONDBACK MOTH (Plutella xylostella) larvae and pupae moderate in cabbage fields at 4,000-foot elevation in Kula, Maui. (Ah Sam). SOUTHERN GREEN STINK BUG (Nezara viridula) generally light throughout State; nymphs and adults scattered in some snap bean and corn plantings on Oahu. (Funasaki). Eggs, larvae, and pupae of IMPORTED CABBAGEWORM (Pieris rapae) and CABBAGE LOOPER (Trichoplusia ni) light to medium on cauliflower at Pulehu, Maui; larval damage light to moderate. (Miyahira, Ah Sam).

Citrus - BLACK CITRUS APHID (Toxoptera aurantii) light to moderate in acre of citrus at Haiku, Maui. (Takishita).

Shade Trees - BARNACLE SCALE (Ceroplastes cirripediformis) adults light on 40 fiddlewood trees due to effective controls along Lunalilo Home Road at Koko Head, Oahu; averaged 5 adults per foot compared with about 30 adults and numerous nymphs per inch in early September. (Nakao).

Miscellaneous - VAGRANT GRASSHOPPER (Schistocerca vaga) adult counts at Honolulu, Oahu, in past weeks were 1 in Pauoa, 1 in downtown Honolulu, 1 in a warehouse, and 1 at Pier 10; first record of grasshoppers in city proper. (Suzukawa, Fine).

LIGHT TRAP COLLECTIONS

FLORIDA - Gainesville - 12/11, BL - Armyworm (Pseudaletia unipuncta) 11, black cutworm (Agrotis ipsilon) 3, yellow-striped armyworm (Prodenia ornithogalli) 2. Gainesville - 12/19, BL - Armyworm 5, black cutworm 3, granulate cutworm (Feltia subterranea) 5, yellow-striped armyworm 5. Sanford - 12/4-8, BL - Black cutworm 9, cabbage looper (Trichoplusia ni) 17, corn earworm (Heliothis zea) 1, fall armyworm (Spodoptera frugiperda) 10, granulate cutworm 15, yellow-striped armyworm 2. Sanford - 12/12-15, BL - Black cutworm 20, cabbage looper 1, fall armyworm 6, granulate cutworm 22, yellow-striped armyworm 14. SOUTH CAROLINA - Charleston - 12/4-10, BL, 35-75°F., 0.25 precip. - Armyworm 13, black cutworm 9, cabbage looper 1, corn earworm 2, fall armyworm 4, granulate cutworm 8, yellow-striped armyworm 3. Charleston - 12/11-17, BL, 37-76°F., 0.31 precip. - Fall armyworm 3, granulate cutworm 4.

Corn Rootworm Situation in the U.S. - 1967

In the fall of 1967 a questionaire was submitted to entomologists in 30 States in an attempt to gather information on the corn rootworm problem. Responses were received from 25 of these States.

The three most destructive corn rootworm species infested an area which includes almost all of the eastern two-thirds of the United States. The southern corn rootworm (Diabrotica undecimpunctata howardi) is found in 39 States ranging from New Hampshire in the Northeast to Florida in the South and Nevada in the West. The northern corn rootworm (Diabrotica longicornis) is present in 26 States that range from New Hampshire to Wyoming with the heaviest continuous infestation extending from Ohio to Nebraska. The western corn rootworm (Diabrotica virgifera) is found in 14 States centered in the Corn Belt area. The accompanying maps give the known distribution of these three corn rootworms in the United States.

Control costs and/or crop losses were reported by 16 of the 25 responding States. An estimated 11,779,700 acres were treated for corn rootworms during 1967. The estimated corn crop loss was $85,385,010. The average cost per acre to control corn rootworms ranged from $1.00 to $6.00 and averaged $2.40.

The Major Problem Area

According to the survey, all of the major corn-producing States experienced corn rootworm problems in 1967. The northern corn rootworm was dominant in Ohio, Wisconsin, Missouri, Illinois, and Indiana while the western species prevailed in Iowa, Kansas, and Nebraska. Of these States, only Kansas and Nebraska reported that rootworm populations had not increased over the past several years. The continuous planting of corn, increased corn acreages, and chlorinated hydrocarbon insecticide resistance were the major factors contributing to the 1967 corn rootworm problems in these States.

The predictions for 1968 were for a continuing problem with more control efforts along with population increases of northern and western corn rootworms in Illinois and western corn rootworm in Missouri. With the exception of Iowa, all the above States reported corn rootworm adults had affected pollination. Annual rotation of corn with soybeans or weed-free crops was listed as the chief cultural practice used. Resistance to recommended insecticides ranged from none in Indiana and Iowa to some resistance to chlorinated hydrocarbons in Missouri, Ohio, Illinois, Nebraska, Kansas, and Wisconsin.

Conditions in the South and Southwest

Noticeable corn rootworm problems in the Southern and Southwestern States during 1967 were limited to Alabama, South Carolina, Kentucky, and Tennessee while Texas, Oklahoma, Mississippi, and Arkansas reported no real importance. They were only a minor problem in Georgia and North Carolina. The southern species was dominant in all States except Tennessee where the northern species was most numerous. Only Texas, South Carolina, and Kentucky reported rootworm increases over the past several years. The continuous planting of corn, increased corn acreages, and suitable host plants were among the factors contributing to the 1967 problems.

The 1968 outlook in the Southern States ranged from increased importance in Texas and Kentucky to no problem in Alabama. Unchanged conditions were predicted for South Carolina, North Carolina, and Mississippi with only minor difficulties forcasted for Tennessee and Oklahoma.

Rootworm adults were reported as affecting pollination in Kentucky, South Carolina, Tennessee, and Texas. Crop rotation, early planting, and decreased corn acreages were cultural practices used to reduce the importance of corn rootworms. Only South Carolina noted a resistance to recommended insecticides.

Conditions in the East and Michigan

Corn-producing States in the East generally reported that rootworms were of limited or of no significance in 1967. The southern corn rootworm was dominant in Delaware, Maryland, and Pennsylvania while the northern species prevailed in Michigan. Only Michigan reported that rootworm populations had not increased over the past few years. Continuous corn planting and late planting were factors contributing to the 1967 corn rootworm problems of the above States.

Predictions for 1968 were for conditions to remain the same as in 1967 in all the States except Delaware where the northern species may become important. Crop rotation was the cultural practice used in Maryland, Pennsylvania, and Michigan to prevent corn rootworm problems. Rootworm adults affected pollination only in Michigan.

Conditions in the West

The important corn-producing States in the West experienced a limited problem in 1967. The western corn rootworm was the dominant species in Colorado and Wyoming. Both States reported that populations had increased over the past several years and attributed continuous planting of corn as the major factor for this problem.

The general outlook for 1968 predicted abundant populations in nonrotated fields in eastern Colorado and considerable damage in Goshen and Platte Counties of Wyoming. Corn rootworm adults affected pollination to some extent in both States. The main cultural practice employed to prevent rootworm problems was crop rotation. Rootworm resistance to recommended insecticides was noted only in Colorado.

Outlook

The general 1968 outlook for all the reporting States was for a continuing problem in the major corn-producing States, little increased importance in the Southern States, very minor importance in the Eastern States, and abundant and/or damaging populations in the Western States.

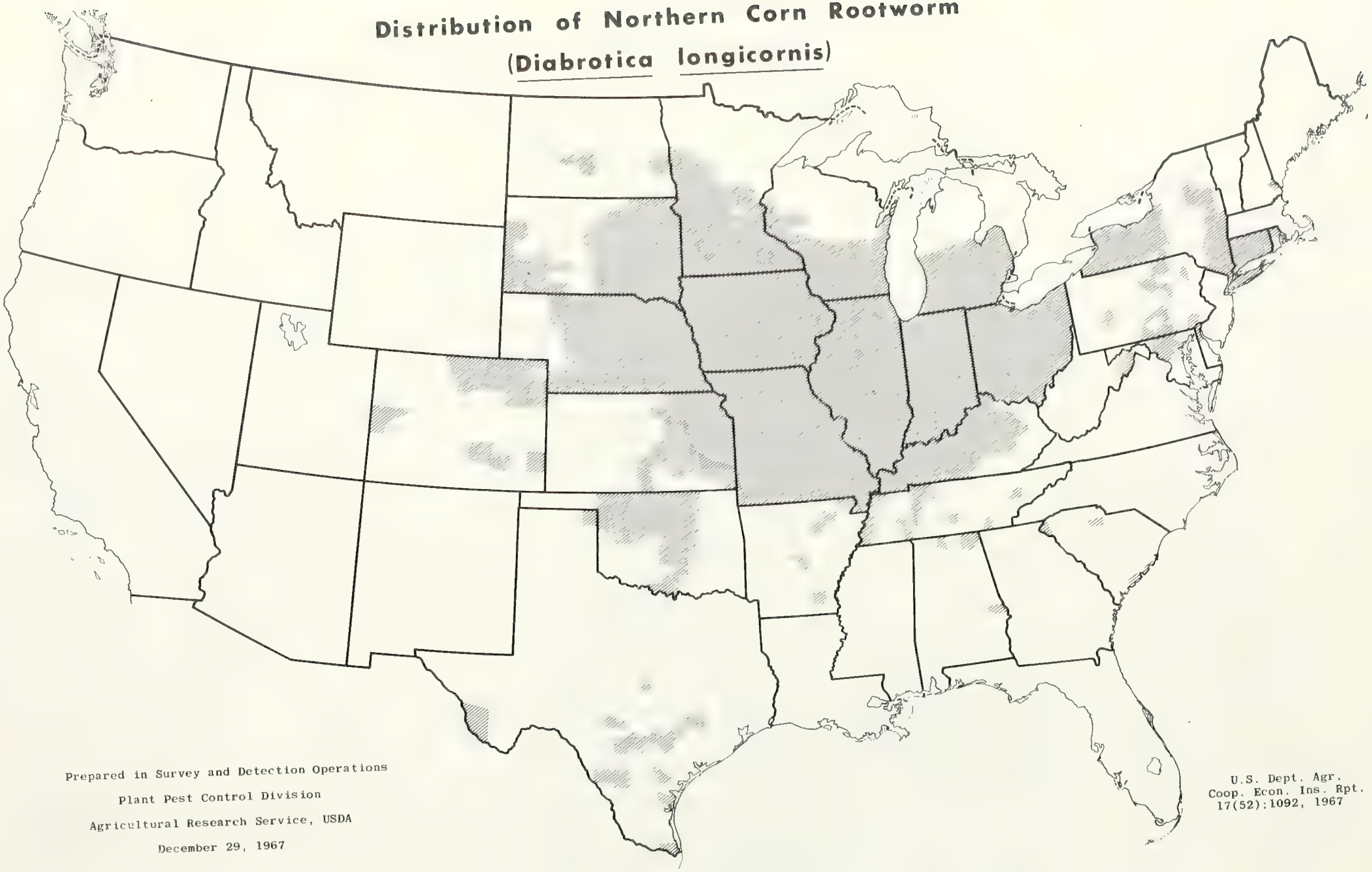
CORN ROOTWORM IN THE UNITED STATES - 1967

MAJOR PROBLEM AREA	PROBLEM ON CORN	DOMINANT SPECIES	POPULATIONS INCREASING	CONTRIBUTING FACTORS TO PROBLEM	1968 OUTLOOK	CULTURAL PRACTICES	ESTIMATED ACREAGE TREATED (1000)	CONTROL COST PER ACRE (DOLLARS)	ESTIMATED CORN LOSS ($1000)
Illinois	Yes	Northern	Yes	Continuous corn, chlorinated hydrocarbon resistance	Northern and western species increasing in northern area	Crop rotation	1,500.00	2.25	3,500.00
Indiana	Yes	Northern	Yes	Continuous corn	Unchanged	Rotation of corn and soybeans	1,800.00	2.00	5,100.00
Iowa	Yes	Western	Yes	Increased corn acreages, chlorinated hydrocarbon resistance	More control treatments	Rotation of corn and soybeans	4,200.00	2.41	49,000.00
Kansas	Yes	Western	No	Increased corn acreages, continuous corn	Continuous corn area damage can be severe if no controls used	Crop rotation	550.00	2.50	750.00
Missouri	Yes	Northern	Yes	Lack of crop rotation, lack of adequate insecticide application equipment, resistance to chlorinated hydrocarbons	Western species will expand one tier of counties south of 1967 line	Crop rotation	-	-	1,708.51
Nebraska	Yes	Western	No	Continuous corn, changing cropping practices, lack of long-lasting chemicals	Routine problem	Crop rotation	1,700.00	2.50	15,000.00
Ohio	Yes	Northern	Yes	Continuous corn, late planting	Unchanged	Crop rotation	1,475.00	1.50	9,000.00
Wisconsin	Yes	Northern	Yes	Chlorinated hydrocarbon resistance	Greater problem than 1967	Crop rotation	435.00	2.50	-

SOUTH AND SOUTHWEST	PROBLEM ON CORN	DOMINANT SPECIES	POPULATIONS INCREASING	CONTRIBUTING FACTORS TO PROBLEM	1968 OUTLOOK	CULTURAL PRACTICES	ESTIMATED ACREAGE TREATED (1000)	CONTROL COST PER ACRE (DOLLARS)	ESTIMATED CORN LOSS ($1000)
Alabama	Yes	Southern	No	Suitable host plants for adults on land to be planted in corn	No major problems	Winter legumes not followed by corn	-	-	-
Arkansas	No	Southern	No	No problem	-	None	-	-	-
Georgia	Occasionally	Southern	No	-	-	None	-	-	-
Kentucky	Yes	Southern	Yes	Increased corn acreage, lack of control treating	Increased damage from northern and southern species	None	50.00	2.20	500.00
Mississippi	No	Southern	No	No problem	Unchanged	None	None	None	None
North Carolina	Minor	Southern	No	No problem	Unchanged	None	-	-	55.00
Oklahoma	No	Southern	No	No problem	No major problem	None	-	-	-
South Carolina	Yes	Southern	Yes	Resistance to chlorinated hydrocarbons	Unchanged	Early planting	-	-	-
Tennessee	Yes	Northern	No	Continuous corn	Very minor problem	Removal of fields from corn production	0.75	1.00	15.00
Texas	No	Southern	Yes	Increased corn acreage, late planting	More problems	Crop rotation and early planting	10.00	1.50	-
EAST AND MICHIGAN									
Delaware	No	Southern	Yes	-	Northern species may become important	None	-	-	-
Maryland	Very Minor	Southern	Yes	-	-	Crop rotation	-	-	-
Michigan	Limited	Northern	No	Cropping practices, weather, soil type	Unchanged	Crop rotation	20.00	6.00	60.00

EAST AND MICHIGAN (cont.)	PROBLEM ON CORN	DOMINANT SPECIES	POPULATIONS INCREASING	CONTRIBUTING FACTORS TO PROBLEM	1968 OUTLOOK	CULTURAL PRACTICES	ESTIMATED ACREAGE TREATED (1000)	CONTROL COST PER ACRE (DOLLARS)	ESTIMATED CORN LOSS ($1000)
New Jersey	No	-	-	No problem	Unchanged	-	-	-	-
Pennsylvania	No	Southern	Yes	No problem	Unchanged	Crop rotation	0.50	2.50	-
WEST									
Colorado	Yes	Western	Yes	Increasing corn acreages, continuous corn	Abundant in non-rotated fields	Crop rotation	37.45	2.50	200.00
Wyoming	Yes	Western	Yes	Continuous corn	Considerable damage in Goshen and Platte Counties	Crop rotation, removal of corn for two years before replanting corn	1.00	-	1.50

Distribution of Northern Corn Rootworm
(*Diabrotica longicornis*)



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Plant Pest Control Division

Agricultural Research Service, USDA

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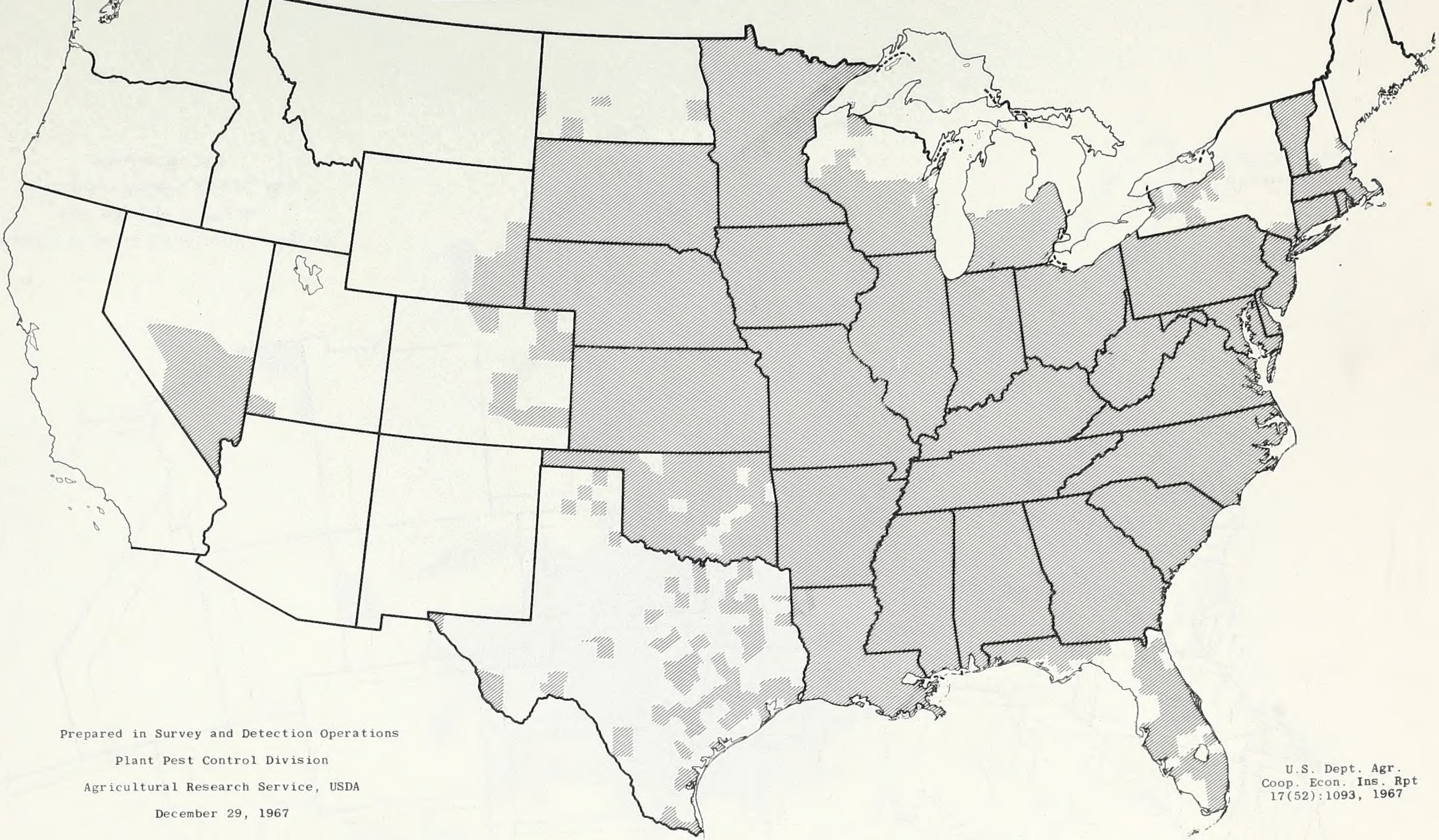
U.S. Dept. Agr.
Coop. Econ. Ins. Rpt.
17(52):1092, 1967

Distribution of Southern Corn Rootworm

(*Diabrotica undecimpunctata howardi*)



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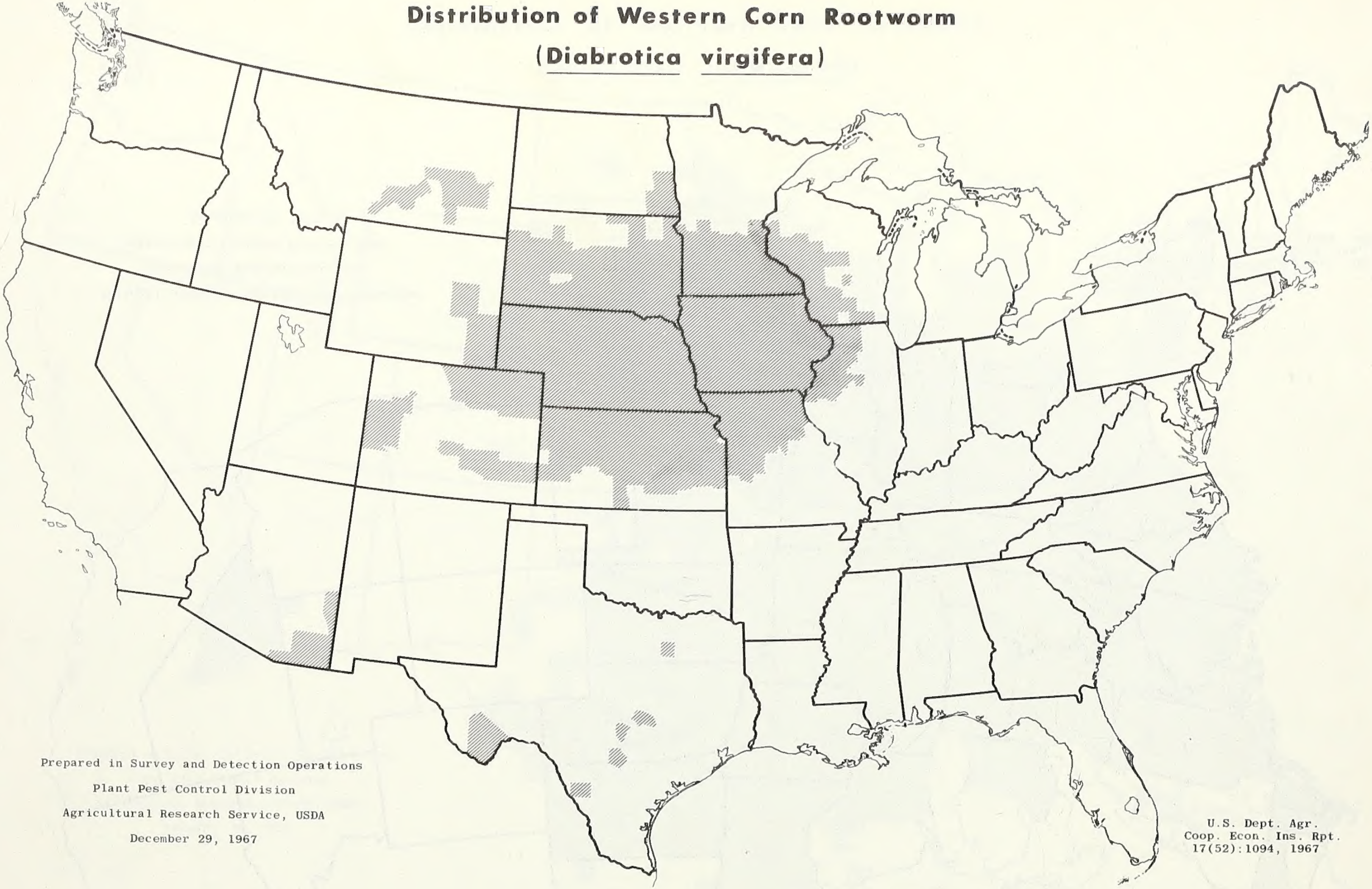
Distribution of Western Corn Rootworm

(*Diabrotica virgifera*)



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